IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (Original): A method for transmitting high-frequency signals in an optical communication system, the method comprising the steps of:

combining an optical signal, a first optical local component from a local light source and a second optical local component from the local light source having a predetermined frequency differential from the first optical local component;

selecting a first high-frequency signal which consists of two predetermined electrical components from plural electrical components obtained by an optical frequency mixing process; and

mixing the two selected electrical components included in the first high-frequency signal.

Claim 2 (Original): A method for transmitting high-frequency signals in an optical communication system, the method comprising the steps of:

transmitting an optical signal that includes an optical carrier component and an optical sideband component obtained by modulation with a high-frequency signal whose frequency is predetermined;

combining an optical signal, a first optical local component from a local light source and a second optical local component from the local light source having a predetermined frequency differential from the first optical local component;

selecting a first high-frequency signal which consists of two predetermined electrical components from plural electrical components obtained by an optical frequency mixing process; and

selecting a second high-frequency signal whose frequency is lower by an amount of predetermined frequency differential than a carrier frequency of the first high-frequency signal obtained by the optical frequency mixing process.

Claim 3 (Original): A method for transmitting high-frequency signals in an optical communication system, the method comprising the steps of:

transmitting an optical signal that includes an optical carrier component and an optical sideband component obtained by modulation with a high-frequency signal whose frequency is predetermined;

extracting an original high-frequency signal from the transmitted optical signal;

combining an optical signal, a first optical local component from a local light source and a second optical local component from the local light source having a predetermined frequency differential from the first optical local component;

making a carrier frequency of the extracted original high-frequency signal coincide with the predetermined frequency differential; and

selecting two predetermined electrical components from plural electrical components obtained by an optical frequency mixing process.

Claim 4 (Original): A method for transmitting high-frequency signals in an optical communication system, the method comprising the steps of:

transmitting an optical signal that includes an optical carrier component and an optical sideband component obtained by modulation with a high-frequency signal whose frequency is predetermined;

combining an optical signal, a first optical local component from a local light source and a second optical local component from the local light source having a predetermined frequency differential from the first optical local component;

selecting, as a first optical signal, lights containing the optical sideband component included in the optical signal and the first optical local component from the local light source;

selecting, as a second optical signal, lights containing the optical carrier component included in the optical signal and the second optical local component from the local light source; and

selecting a signal with a relatively low frequency after mixing the first and second optical signals.

Claim 5 (Original): An apparatus for transmitting high-frequency signals in an optical communication system, the apparatus comprising:

means for combining an optical signal, a first optical local component from a local light source and a second optical local component from the local light source having a predetermined frequency differential from the first optical local component;

means for selecting a first high-frequency signal which consists of two predetermined electrical components from plural electrical components obtained by an optical frequency mixing process; and

means for mixing the two selected electrical components included in the first high-frequency signal.

Claim 6 (Original): An apparatus for transmitting high-frequency signals in an optical communication system, the apparatus comprising:

means for transmitting an optical signal that includes an optical carrier component and an optical sideband component obtained by modulation with a high-frequency signal whose frequency is predetermined;

means for combining an optical signal, a first optical local component from a local light source and a second optical local component from the local light source having a predetermined frequency differential from the first optical local component;

means for selecting a first high-frequency signal which consists of two predetermined electrical components from plural electrical components obtained by an optical frequency mixing process; and

means for selecting a second high-frequency signal whose frequency is lower by an amount of predetermined frequency differential than a carrier frequency of the first high-frequency signal obtained by the optical frequency mixing process.

Claim 7 (Original): An apparatus for transmitting high-frequency signals in an optical communication system, the apparatus comprising:

means for transmitting an optical signal that includes an optical carrier component and an optical sideband component obtained by modulation with a high-frequency signal whose frequency is predetermined;

means for extracting an original high-frequency signal from the transmitted optical signal;

means for combining an optical signal, a first optical local component from a local light source and a second optical local component from the local light source having a predetermined frequency differential from the first optical local component;

means for making a carrier frequency of the extracted original high-frequency signal coincide with the predetermined frequency differential; and

means for selecting two predetermined electrical components from plural electrical components obtained by an optical frequency mixing process.

Claim 8 (Original): An apparatus for transmitting high-frequency signals in an optical communication system, the apparatus comprising:

means for transmitting an optical signal that includes an optical carrier component and an optical sideband component obtained by modulation with a high-frequency signal whose frequency is predetermined;

means for combining an optical signal, a first optical local component from a local light source and a second optical local component from the local light source having a predetermined frequency differential from the first optical local component;

means for selecting, as a second optical signal, lights containing the optical carrier component included in the optical signal and the second optical local component from the local light source; and

means for selecting a signal with a relatively low frequency after mixing the first and second optical signals.

Claim 9 (Original): An apparatus according to any one of claims 5 to 8, further comprising:

means for generating an optical carrier component with a single-mode light source that produces a single-mode optical carrier; and

means for generating an optical sideband component obtained by modulating the optical carrier component by a high-frequency signal by means of optical modulation.

Claim 10 (Original): An apparatus according to any one of claims 5 to 8, wherein the combining means has a configuration that projects plural light beams onto a photo-detector to be combined and extracts at least part of combined optical signal as electrical signals.

Claim 11 (Original): An apparatus according to claim 10, wherein the photo-detector has a configuration of a balanced receiver.

Claim 12 (Original): An apparatus according to any one of claims 5 to 8, wherein the means for generating the first optical local component from the local light source and the second optical local component from the local light source having the predetermined frequency differential from the first local light uses a method for extracting two desired continuous waves from an optical spectrum emitted from a pulsed light source.

Claim 13 (Original): An apparatus according to any one of claims 5 to 8, wherein the means for generating the first optical local component from the local light source and the second optical local component from the local light source having the predetermined frequency differential from the first optical local component uses a method for extracting two desired continuous waves from an optical spectrum emitted from a pulsed light source with optical injection locking.

Claim 14 (Original): An apparatus according to any one of claims 5 to 8, wherein the means for generating the first optical local component from the local light source and the second optical local component from the local light source having the predetermined frequency differential from the first optical local component uses a method that utilizes a light source that emits two adjacent lightwaves.

Claim 15 (Original): An apparatus according to any one of claims 5 to 8, wherein the means for generating the first optical local component from the local light source and the second optical local component from the local light source having the predetermined frequency differential from the first optical local component uses a method of selectively producing two light waves by modulating light from a single-mode light source.

Claim 16 (New): A method for transmitting high frequency signals in an optical communication system, the method comprising the steps of:

combining an optical signal, a first optical local component from a local light source and a second optical local component from the local light source having a predetermined frequency differential from the first optical local component;

selecting a first signal which comprises two predetermined signal components from plural signal components obtained by a signal mixing process; and

mixing the two signal components contained in the selected first signal.

Claim 17 (New): The method according to claim 16, wherein the plural signal components are obtained by an optical frequency mixing process to form the first signal as a first high frequency signal.

Claim 18 (New): The method according to claim 17, further comprising the step of:

selecting a second high frequency signal whose frequency is lower by an amount of the predetermined frequency differential than a carrier frequency of the first high frequency signal obtained by the optical frequency mixing process.

Claim 19 (New): The method according to claim 16, wherein the first and second optical local components are generated using an original high frequency signal extracted from the high frequency signals transmitted.

Claim 20 (New): The method according to claim 16, wherein the step of selecting the first signal and the step of mixing the two signal components are substituted with the steps of selecting a first optical signal and a second optical signal, mixing the first and second optical signals and selecting a signal with a lower frequency, in which the first optical signal is light containing an optical sideband component included in the first optical signal and the first optical local component from the local light source, and the second optical signal is light containing an optical carrier component included in the second optical signal and the second optical local component from the local light source.

Claim 21 (New): An apparatus for transmitting high-frequency signals in an optical communication system, the apparatus comprising:

means for combining an optical signal, a first optical local component from a local light source and a second optical local component from the local light source having a predetermined frequency differential from the first optical local component;

means for selecting a first signal which contains two predetermined signal components from plural signal components obtained by an optical frequency mixing process; and

means for mixing the two signal components contained in the selected first signal.

Claim 22 (New): The apparatus according to claim 21, wherein the plural signal components are obtained by the optical frequency mixing process to form the first signal as a first high frequency signal.

Claim 23 (New): The apparatus according to claim 22, further comprising:

means for selecting a second high frequency signal whose frequency is lower by an amount of the predetermined frequency differential than a carrier frequency of the first high frequency signal obtained by the optical frequency mixing process.

Claim 24 (New): The apparatus according to claim 21, wherein the first and second optical local components are generated using an original high frequency signal extracted from the high frequency signals transmitted.

Claim 25 (New): The apparatus according to claim 21, wherein the means for selecting the first signal and the means for mixing the two signal components are substituted with means for selecting a first optical signal and a second optical signal, means for mixing

the first and second optical signals and means for selecting a signal with a lower frequency, in which the first optical signal is light containing an optical sideband component included in the first optical signal and the first optical local component from the local light source, and the second optical signal is light containing an optical carrier component included in the second optical signal and the second optical local component from the local light source.

Claim 26 (New): The apparatus according to claim 22, further comprising:

means for generating an optical carrier component with a single-mode light source that produces a single-mode optical carrier; and

means for generating an optical sideband component obtained by modulating the optical carrier component by a high frequency signal by means of optical modulation.

Claim 27 (New): The apparatus according to claim 23, further comprising:

means for generating an optical carrier component with a single-mode light source that produces a single-mode optical carrier; and

means for generating an optical sideband component obtained by modulating the optical carrier component by a high frequency signal by means of optical modulation.

Claim 28 (New): The apparatus according to claim 24, further comprising:

means for generating an optical carrier component with a single-mode light source that produces a single-mode optical carrier; and

means for generating an optical sideband component obtained by modulating the optical carrier component by a high frequency signal by means of optical modulation.

Claim 29 (New): The apparatus according to claim 25, further comprising:

means for generating an optical carrier component with a single-mode light source that produces a single-mode optical carrier; and

means for generating an optical sideband component obtained by modulating the optical carrier component by a high frequency signal by means of optical modulation.

Claim 30 (New): The apparatus according to claim 22, wherein the means for combining has a configuration that projects plural light beams onto a photo-detector to be combined and extracts at least part of combined optical signal as electrical signals.

Claim 31 (New): The apparatus according to claim 23, wherein the means for combining has a configuration that projects plural light beams onto a photo-detector to be combined and extracts at least part of combined optical signal as electrical signals.

Claim 32 (New): The apparatus according to claim 24, wherein the means for combining has a configuration that projects plural light beams onto a photo-detector to be combined and extracts at least part of combined optical signal as electrical signals.

Claim 33 (New): The apparatus according to claim 25, wherein the means for combining has a configuration that projects plural light beams onto a photo-detector to be combined and extracts at least part of combined optical signal as electrical signals.

Claim 34 (New): The apparatus according to claim 30, wherein the photo-detector has a configuration of a balanced receiver.

Claim 35 (New): The apparatus according to claim 31, wherein the photo-detector has a configuration of a balanced receiver.

Claim 36 (New): The apparatus according to claim 32, wherein the photo-detector has a configuration of a balanced receiver.

Claim 37 (New): The apparatus according to claim 33, wherein the photo-detector has a configuration of a balanced receiver.

Claim 38 (New): The apparatus according to claim 22, wherein the means for generating the first and second optical local components from the local light source uses a method for extracting two desired continuous waves from an optical spectrum emitted from a pulsed light source.

Claim 39 (New): The apparatus according to claim 23, wherein the means for generating the first and second optical local components from the local light source uses a method for extracting two desired continuous waves from an optical spectrum emitted from a pulsed light source.

Claim 40 (New): The apparatus according to claim 24, wherein the means for generating the first and second optical local components from the local light source uses a method for extracting two desired continuous waves from an optical spectrum emitted from a pulsed light source.

Claim 41 (New): The apparatus according to claim 25, wherein the means for generating the first and second optical local components from the local light source uses a method for extracting two desired continuous waves from an optical spectrum emitted from a pulsed light source.

Claim 42 (New): The apparatus according to claim 22, wherein the means for generating the first and second optical local components from the local light source uses a method for extracting two desired continuous waves from an optical spectrum emitted from a pulsed light source with optical injection locking.

Claim 43 (New): The apparatus according to claim 23, wherein the means for generating the first and second optical local components from the local light source uses a method for extracting two desired continuous waves from an optical spectrum emitted from a pulsed light source with optical injection locking.

Claim 44 (New): The apparatus according to claim 24, wherein the means for generating the first and second optical local components from the local light source uses a method for extracting two desired continuous waves from an optical spectrum emitted from a pulsed light source with optical injection locking.

Claim 45 (New): The apparatus according to claim 25, wherein the means for generating the first and second optical local components from the local light source uses a

method for extracting two desired continuous waves from an optical spectrum emitted from a pulsed light source with optical injection locking.

Claim 46 (New): The apparatus according to claim 22, wherein the means for generating the first and second optical local components from the local light source uses a method that utilizes a light source that emits two adjacent light waves.

Claim 47 (New): The apparatus according to claim 23, wherein the means for generating the first and second optical local components from the local light source uses a method that utilizes a light source that emits two adjacent light waves.

Claim 48 (New): The apparatus according to claim 24, wherein the means for generating the first and second optical local components from the local light source uses a method that utilizes a light source that emits two adjacent light waves.

Claim 49 (New): The apparatus according to claim 25, wherein the means for generating the first and second optical local components from the local light source uses a method that utilizes a light source that emits two adjacent light waves.

Claim 50 (New): The apparatus according to claim 22, wherein the means for generating the first and second optical local components from the local light source uses a method of selectively producing two light waves by modulating light from a single-mode light source.

Claim 51 (New): The apparatus according to claim 23, wherein the means for generating the first and second optical local components from the local light source uses a method of selectively producing two light waves by modulating light from a single-mode light source.

Claim 52 (New): The apparatus according to claim 24, wherein the means for generating the first and second optical local components from the local light source uses a method of selectively producing two light waves by modulating light from a single-mode light source.

Claim 53 (New): The apparatus according to claim 25, wherein the means for generating the first and second optical local components from the local light source uses a method of selectively producing two light waves by modulating light from a single-mode light source.